September 2018
ECB staff macroeconomic projections for the euro area[1]

Following strong growth in 2017, the economic expansion in the euro area slowed in the first half of 2018, largely on the back of a weakening in global trade. Although global uncertainties have softened the near-term outlook, the euro area expansion is projected to continue at a pace slightly above potential, reflecting the favourable impact of the very accommodative stance of monetary policy, improving labour market conditions and stronger balance sheets. A slight moderation in real GDP growth, from 2.0% in 2018 to 1.7% in 2020, is mainly explained by a gradual weakening of the stimulus from world trade and growing labour supply shortages. HICP inflation is expected to average 1.7% in each year of the projection horizon, albeit with some volatility in its quarterly profile. The stable path of the annual average inflation rates conceals a decline in the annual rate of the energy component as the impact of the past increases in oil prices fades, which is offset by gradually rising underlying inflation as supply constraints become increasingly binding.

1 Real economy

Following very strong growth in 2017, the expansion weakened considerably in the first half of 2018. The pull-back from very high levels of growth is related mainly to a weaker impetus from external trade, reflecting the impact of a weakening of global trade compounded by the impact of the euro's past appreciation. While the slowdown in activity appears to have been mainly driven by demand-side factors, a number of temporary and supply-side factors are also likely to have dampened activity somewhat in the first half of 2018.

Looking ahead, over the next few quarters euro area real GDP growth is expected to remain stable. This is in line with business and consumer confidence indicators, which remain at elevated levels by historical standards, despite a decline

[1] The macroeconomic projections produced by ECB or Eurosystem staff are an input to the Governing Council's assessment of economic developments and the risks to price stability. These projections are neither endorsed by the Governing Council nor do they necessarily reflect the views of the Governing Council on the outlook for the euro area. Information on the procedures and techniques used is given in *A guide to the Eurosystem/ECB staff macroeconomic projection exercises*, ECB, July 2016, which is available on the ECB's website. The cut-off date for technical assumptions, such as for oil prices and exchange rates, was 21 August 2018 (see Box 1). The cut-off date for including other information in this exercise was 29 August 2018.
The current macroeconomic projection exercise covers the period 2018-20. Projections over such a long horizon are subject to very high uncertainty, and this should be borne in mind when interpreting them. See the article entitled "An assessment of Eurosystem staff macroeconomic projections" in the May 2013 issue of the ECB's Monthly Bulletin.
See http://www.ecb.europa.eu/pub/projections/html/index.en.html for an accessible version of the data underlying selected tables and charts.

in some of them earlier in the year. The outlook is also confirmed by leading indicators, such as EuroCOIN and the Conference Board Leading Economic Index.

Table 1

Macroeconomic projections for the euro area[1)]

(annual percentage changes)

	September 2018				June 2018			
	2017	2018	2019	2020	2017	2018	2019	2020
Real GDP	2.5	2.0	1.8	1.7	2.5	2.1	1.9	1.7
		[1.8 - 2.2][2)]	[1.0 - 2.6][2)]	[0.6 - 2.8][2)]		[1.8 - 2.4][2)]	[0.9 - 2.9][2)]	[0.6 - 2.8][2)]
Private consumption	1.7	1.5	1.7	1.6	1.7	1.6	1.7	1.5
Government consumption	1.2	1.4	1.4	1.3	1.2	1.3	1.3	1.2
Gross fixed capital formation	2.8	4.0	3.2	2.9	3.3	4.2	3.3	2.8
Exports[3)]	5.6	3.1	3.8	3.6	5.4	4.2	4.4	3.8
Imports[3)]	4.2	3.5	4.5	3.9	4.6	4.1	4.7	4.0
Employment	1.6	1.4	0.9	0.8	1.6	1.4	1.1	0.8
Unemployment rate (percentage of labour force)	9.1	8.3	7.8	7.4	9.1	8.4	7.8	7.3
HICP	1.5	1.7	1.7	1.7	1.5	1.7	1.7	1.7
		[1.6 - 1.8][2)]	[1.1 - 2.3][2)]	[0.9 - 2.5][2)]		[1.6 - 1.8][2)]	[1.0 - 2.4][2)]	[0.9 - 2.5][2)]
HICP excluding energy	1.2	1.3	1.6	1.8	1.2	1.3	1.7	1.9
HICP excluding energy and food	1.0	1.1	1.5	1.8	1.0	1.1	1.6	1.9
HICP excluding energy, food and changes in indirect taxes[4)]	1.0	1.1	1.5	1.8	1.0	1.1	1.5	1.9
Unit labour costs	0.7	1.6	1.3	1.7	0.7	1.5	1.2	1.8
Compensation per employee	1.5	2.2	2.2	2.7	1.6	2.3	2.1	2.7
Labour productivity	0.9	0.6	0.9	1.0	0.9	0.7	0.9	0.9
General government budget balance (percentage of GDP)	-1.0	-0.6	-0.8	-0.5	-0.9	-0.7	-0.8	-0.5
Structural budget balance (percentage of GDP)[5)]	-1.0	-0.8	-1.0	-1.0	-0.9	-0.9	-1.0	-0.9
General government gross debt (percentage of GDP)	86.6	84.8	82.8	80.6	86.7	84.8	82.7	80.4
Current account balance (percentage of GDP)	3.5	3.2	2.8	2.8	3.5	2.9	2.5	2.5

1) Real GDP and components refer to working day-adjusted data.
2) The ranges shown around the projections are based on the differences between actual outcomes and previous projections carried out over a number of years. The width of the ranges is twice the average absolute value of these differences. The method used for calculating the ranges, involving a correction for exceptional events, is documented in *New procedure for constructing Eurosystem and ECB staff projection ranges*, ECB, December 2009, available on the ECB's website.
3) Including intra-euro area trade.
4) The sub-index is based on estimates of actual impacts of indirect taxes. This may differ from Eurostat data, which assume a full and immediate pass-through of tax impacts to the HICP.
5) Calculated as the government balance net of transitory effects of the economic cycle and temporary measures taken by governments (for the ESCB approach, see *Working Paper Series*, No 77, ECB, September 2001, and *Working Paper Series*, No 579, ECB, January 2007). The projection of the structural balance is not derived from an aggregate measure of the output gap. Under the ESCB methodology, cyclical components are calculated separately for different revenue and spending items. For more details, see the box entitled "Cyclical adjustment of the government budget balance" in the March 2012 issue of the ECB's Monthly Bulletin and the box entitled "The structural balance as an indicator of the underlying fiscal position" in the September 2014 issue of the ECB's Monthly Bulletin.

Over the medium term, the fundamentals remain in place for a continued expansion. A number of favourable factors are expected to continue to support domestic demand. The ECB's very accommodative monetary policy stance continues to be transmitted to the economy. Growth in lending to the private sector continues to increase, spurred by low interest rates and favourable bank lending conditions. Lower deleveraging needs will also contribute to the dynamism of private expenditure. The fiscal stance is projected to turn slightly expansionary in 2019 and to be broadly neutral in 2020. Growth in private consumption and in residential investment should also benefit from robust labour market conditions and rising net worth. At the same time, business investment will continue to expand in the context of rising profits and high capacity utilisation. Euro area exports are expected to benefit from the ongoing expansion of global economic activity and the corresponding growth in euro area foreign demand.

Nevertheless, real GDP growth is projected to slow slightly over the projection horizon, as some tailwinds gradually fade. A deceleration in euro area foreign demand is expected to dampen export growth in 2018 and 2019. Employment growth is expected to slow substantially in 2019 and 2020, mostly related to increasingly binding labour supply shortages in some countries. In addition, private consumption growth is expected to be tempered by a normalisation of the saving ratio, from low levels, in the context of the cyclical expansion in some countries.

Real disposable income growth is set to strengthen in 2018 and 2019, before weakening in 2020. The contribution of gross wages and salaries to nominal disposable income growth is projected to increase markedly in 2018, driven by stronger wage growth, before weakening somewhat during the remainder of the projection horizon, as further increases in nominal wage growth are more than offset by the impact of the slowdown in employment. Growth in other personal income is projected to pick up gradually over the projection horizon, in line with rising profits. The contribution of net fiscal transfers is expected to remain negative in 2018. It is then expected to turn positive in 2019, in the context of cuts to direct taxation compounded by rising transfers to households, before becoming neutral in 2020. Overall, the composition of nominal disposable income growth is expected to become less favourable for household spending as disposable income will be driven more by wages than employment, since consumption typically reacts somewhat more strongly to changes in the latter.

Private consumption is projected to remain resilient over the projection horizon, supported by favourable bank lending conditions reinforced by the ECB's monetary policy measures, and by progress achieved in deleveraging. While low interest rates have affected households' interest earnings and interest payments, they tend to favour net borrowers relative to net savers. As the former typically have a higher marginal propensity to consume, this should support aggregate private consumption. In addition, rising household net worth, as well as progress achieved in deleveraging, should also support consumption.

The household saving ratio is expected to increase gradually over the projection horizon from historically low levels. The saving ratio declined in 2017, mainly reflecting the improvement in the economic and financial situation of households, some unwinding of pent-up demand in the context of previously postponed big-ticket purchases and the impact of very low interest rates on households' propensity to save. The saving ratio is projected to increase over the projection horizon, mostly reflecting a normalisation in the context of the cyclical expansion. In addition, it is expected that private households will increase savings in response to direct tax cuts in some countries.

Box 1

Technical assumptions about interest rates, exchange rates and commodity prices

Compared with the June 2018 projections, the technical assumptions include a stronger effective exchange rate of the euro, lower oil prices in US dollars and lower interest rates. The technical assumptions about interest rates and commodity prices are based on market expectations, with a cut-off date of 21 August 2018. Short-term rates refer to the three-month EURIBOR, with market expectations derived from futures rates. The methodology gives an average level for these short-term interest rates of -0.3% for 2018, -0.2% for 2019 and 0.0% for 2020. The market expectations for euro area ten-year nominal government bond yields imply an average level of 1.1% in 2018, 1.3% in 2019 and 1.6% in 2020.[2] Compared with the June 2018 projections, market expectations for short-term interest rates have been revised down by 6 basis points for 2019 and by 19 basis points for 2020, while long-term interest rates have been revised down by 8 basis points for 2018, by 15 basis points for 2019 and by 17 basis points for 2020.

As regards commodity prices, on the basis of the path implied by futures markets by taking the average of the two-week period ending on the cut-off date of 21 August 2018, the price of a barrel of Brent crude oil is assumed to increase from USD 54.4 in 2017 to USD 71.5 in 2018 and USD 71.7 in 2019, and to decline to USD 69.0 in 2020. This path implies that, in comparison with the June 2018 projections, oil prices in US dollars are 4.0% lower in 2018, 2.5% lower in 2019 and 0.4% higher in 2020. The prices of non-energy commodities in US dollars are assumed to rise slightly in 2018, to decline in 2019 and to rebound in 2020.[3]

Bilateral exchange rates are assumed to remain unchanged over the projection horizon at the average levels prevailing in the two-week period ending on the cut-off date of 21 August 2018. This implies an average exchange rate of USD 1.18 per euro in 2018 and of USD 1.14 per euro over 2019-20, compared with USD 1.18 in the June 2018 projections. The effective exchange rate of the euro (against 38 trading partners) is 1.5% stronger than entailed in the June 2018 projections.

Technical assumptions

	September 2018				June 2018			
	2017	2018	2019	2020	2017	2018	2019	2020
Three-month EURIBOR (percentage per annum)	-0.3	-0.3	-0.2	0.0	-0.3	-0.3	-0.2	0.2
Ten-year government bond yields (percentage per annum)	1.0	1.1	1.3	1.6	1.0	1.2	1.5	1.7
Oil price (in USD/barrel)	54.4	71.5	71.7	69.0	54.4	74.5	73.5	68.7
Non-energy commodity prices, in USD (annual percentage change)	8.0	1.9	-2.6	4.2	7.9	9.3	2.5	4.1
USD/EUR exchange rate	1.13	1.18	1.14	1.14	1.13	1.20	1.18	1.18
Euro nominal effective exchange rate (EER38) (annual percentage change)	2.2	5.1	0.6	0.0	2.2	4.4	-0.1	0.0

[2] The assumption for euro area ten-year nominal government bond yields is based on the weighted average of countries' ten-year benchmark bond yields, weighted by annual GDP figures and extended by the forward path derived from the ECB's euro area all-bonds ten-year par yield, with the initial discrepancy between the two series kept constant over the projection horizon. The spreads between country-specific government bond yields and the corresponding euro area average are assumed to be constant over the projection horizon.

[3] Oil and food commodity price assumptions are based on futures prices up to the end of the projection horizon. The prices of other non-energy hard commodities are assumed to follow futures until the third quarter of 2019 and thereafter to evolve in line with global economic activity.

The expansion of residential investment is expected to continue, albeit with decreased momentum. Housing investment picked up strongly during 2016 and 2017, supported by very favourable financing conditions and rising income growth related to ongoing job creation. However, the recovery in housing investment seems to have peaked in early 2018. The key conditions for further increases in residential investment remain in place over the projection horizon, with surveys indicating that households increasingly plan to buy or build a home within the next two years or, in particular, to embark on home improvements. Nonetheless, despite buoyant demand for housing, the momentum of this expansion is expected to be dampened by increasingly binding capacity constraints in the construction sector and adverse demographic trends in some countries. In addition, financing conditions are expected to become slightly tighter, and alternative long-term investment opportunities are likely to emerge gradually as yields rise.

Business investment is expected to continue to recover over the projection horizon, albeit at a gradually declining pace. A number of factors are expected to continue to support business investment: business confidence remains at very high levels on the back of favourable production expectations and large order books, capacity utilisation remains well above its long-term average and lack of equipment is increasingly mentioned as a factor limiting production in manufacturing, financing conditions are expected to remain very supportive over the projection horizon, profits are expected to increase in the context of an already cash-rich non-financial corporation sector, and companies may increase investment as a means of compensating for labour-related supply-side constraints. Moreover, the strong recovery in stock prices observed in recent years, continued accumulation of assets and moderate debt financing growth have brought the leverage ratio (debt to total assets) in the non-financial corporation sector close to historical lows. However, consolidated gross indebtedness (the ratio of debt to income) has declined far less and still stands somewhat above pre-crisis levels. A gradual loss of momentum in business investment over the projection horizon reflects the overall deceleration in both domestic and foreign demand.

Box 2
The international environment

Global economic growth is expected to moderate gradually over the projection horizon in the face of mounting risks and uncertainties. The global economy continued to expand at a steady pace in the first half of 2018. Although global manufacturing has moderated in the past few months, surveys suggest that global activity remains sustained overall. In the near term, however, global economic momentum is expected to moderate. On the one hand, advanced economies continue to benefit from accommodative monetary policies and the sizeable fiscal stimulus in the United States. The past recovery in oil prices has also helped stabilise investment in many oil-exporting economies. On the other hand, uncertainty about future trading relations has risen, and this is expected to hit confidence and investment in the near term. The concerns over trade, the gradual normalisation of monetary policies in advanced economies and policy uncertainties have led to a tightening of financial conditions in recent months, particularly in some emerging market economies. Over the medium term, activity is expected to slow as cyclical forces wane. Negative output gaps have already closed or are closing in most advanced economies and policy support will gradually diminish. China's transition to a lower growth path (less dependent on policy stimulus) should weigh on its outlook. Furthermore, while the economies of commodity exporters are recovering, they still face the need for fiscal consolidation. Overall, global growth (excluding the euro area) is projected to be 3.9% in 2018 and to decline to 3.7% in 2020. Compared with the June 2018 projections, global GDP growth has been revised down by 0.1 percentage point for 2018 and by 0.2 percentage point for 2019. These downward revisions reflect the weaker outlook in some emerging market economies, particularly in Turkey. In addition, it is judged that rising tensions over trade and heightened uncertainties about the global outlook will dampen global investment in the coming quarters.

The international environment

(annual percentage changes)

	September 2018				June 2018			
	2017	2018	2019	2020	2017	2018	2019	2020
World (excluding euro area) real GDP	3.8	3.9	3.7	3.7	3.8	4.0	3.9	3.7
Global (excluding euro area) trade[1)]	5.4	4.6	3.9	3.8	5.2	5.1	4.6	4.0
Euro area foreign demand[2)]	5.3	4.1	3.6	3.6	5.2	5.2	4.3	3.7

1) Calculated as a weighted average of imports.
2) Calculated as a weighted average of imports of euro area trading partners.

After a sharp deceleration in the second quarter of this year, global trade is expected to rebound moderately but remain relatively subdued in the face of mounting uncertainties related to trade protectionism. After strong growth in 2017, global trade decelerated in the first months of this year. Looking ahead, the tariffs implemented so far affect a relatively small proportion of global trade. However, they have heightened concerns about the outlook for trade policies and the global economy, which is expected to weigh on global activity and trade prospects. In the medium term, global trade is projected to expand at a broadly similar pace to global activity. Overall, euro area foreign demand is expected to expand by 4.1% in 2018 and to slow to 3.6% by 2020. Compared with the June 2018 projections, it has been revised down by 1.1 percentage point, 0.7 percentage point and 0.1 percentage point for 2018, 2019 and 2020 respectively. The downward revisions mainly reflect the decline in momentum observed in the data in the short term. Further ahead, they reflect the impact of higher trade tariffs and the effects of weaker projected activity.

Extra-euro area export growth is projected to be dampened in line with slowing foreign demand. Extra-euro area exports are expected to continue growing at a similar pace to euro area foreign demand, implying broadly stable export market shares over the projection horizon. Extra-euro area imports are expected to benefit from the positive domestic demand developments and, in the coming quarters, from the stronger euro. As imports are projected to rise somewhat faster than exports, the contribution of net trade to economic growth is projected to be broadly neutral over the projection horizon, following a very positive contribution in 2017.

Employment growth is projected to decelerate, as labour shortages are expected to become increasingly binding in some countries. Headcount employment in the euro area increased by 0.4% in the first and second quarters of 2018. The recent strength in employment growth has been broad-based across countries, and forward-looking surveys suggest further solid employment growth in the near term. Nevertheless, employment growth is projected to lose some momentum. In 2018 the impact of some favourable temporary factors (such as fiscal stimuli in certain euro area countries) is expected to fade gradually. Towards the end of the projection horizon, labour supply shortages are assumed to intensify in some countries.

Labour force growth is projected to moderate over the projection horizon. The labour force is expected to continue to expand over the projection horizon, reflecting net immigration of workers, the expected integration of refugees and ongoing increases in labour market participation rates (including the reversal of the "discouraged worker" effect). Nevertheless, these positive effects are projected to be gradually offset over the projection horizon by the adverse impact of the ageing of the population, as older cohorts leave the workforce in higher numbers than younger cohorts enter it.

The unemployment rate is expected to decline to 7.4% in 2020. The unemployment rate declined to 8.3% in the second quarter of 2018, which is the lowest level observed since late 2008. Looking ahead, the number of unemployed is projected to continue to decline substantially, nearing the level of its pre-crisis trough.

Reflecting its cyclical pattern, labour productivity is projected to rebound in 2019 and 2020. Following its strong momentum in 2017, labour productivity slowed in the first half of 2018, reflecting the unexpected weakening of activity. A moderate increase in productivity growth is expected in the second half of 2018, reflecting the lagged response of employment to the weaker activity at the start of the year. Looking further ahead, the above-mentioned slowdown in employment growth, the increasing utilisation of capital in the context of diminishing slack, an increase in the number of hours worked per person and some gains in total factor productivity suggest that labour productivity growth will increase later in the projection horizon, gradually converging towards its pre-crisis average rate of 1.0%.

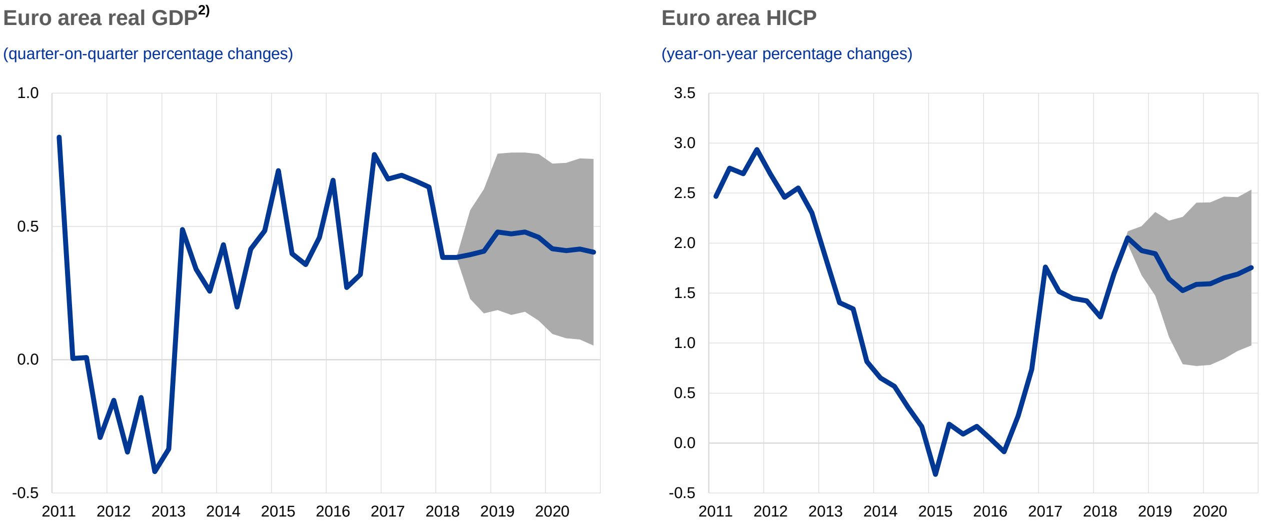
Real GDP growth is expected to remain above potential growth over the projection horizon. Potential output is estimated to have gained some momentum in recent years, supported by increasing contributions from labour and total factor productivity. At the end of the projection horizon, although still lagging actual growth in real GDP, potential output is expected to increase at a rate slightly lower than that before the crisis. It must be noted, however, that both potential growth and its drivers are unobservable and such estimates are surrounded by considerable uncertainty.

Compared with the June 2018 projections, real GDP growth has been revised down slightly for 2018 and 2019. These downward revisions relate mostly to a weaker than previously expected contribution from net trade, reflecting downward revisions to foreign demand and a stronger effective exchange rate of the euro. These effects more than offset the positive impact on domestic demand stemming from lower lending rates and some fiscal stimulus.

Chart 1

Macroeconomic projections[1)]

(quarterly data)



1) The ranges shown around the central projections are based on the differences between actual outcomes and previous projections carried out over a number of years. The width of the ranges is twice the average absolute value of these differences. The method used for calculating the ranges, involving a correction for exceptional events, is documented in *New procedure for constructing Eurosystem and ECB staff projection ranges*, ECB, December 2009, available on the ECB's website.
http://www.ecb.europa.eu/pub/pdf/other/newprocedureforprojections200912en.pdf?917c588c190f66c694c463d2cee934d4
2) Working day-adjusted data.

2 Prices and costs

HICP inflation is projected to average 1.7% in each year of the projection horizon, as a declining profile of HICP energy inflation offsets a gradual strengthening in HICP inflation excluding energy and food. Energy inflation is projected to decline over the whole projection horizon, reflecting downward base effects and a slight decline in crude oil price futures. Underlying inflation is projected to rise on the back of the improving cyclical position of the economy and the related increase in wage growth. Some further upward effects on underlying inflation are expected to come from external price developments as past increases in oil prices indirectly impact HICP inflation excluding energy and food. Overall, HICP inflation excluding energy and food is projected to rise gradually, from 1.1% in 2018 to 1.8% in 2020.

Wage growth is expected to pick up noticeably over the projection horizon as labour markets tighten and the impact of factors that have dampened wage growth in some countries over the past few years fade. Growth in compensation per employee is projected to rise notably over the projection horizon, to 2.7% in 2020. Unit labour cost growth is expected to strengthen in line with growth in compensation per employee, on account of the relatively modest increase in productivity growth over the projection horizon. The main driver behind the pick-up in wage growth is the expected further improvement in euro area labour market conditions, with increasing labour market tightness and distinct labour supply shortages in some parts of the euro area. Favourable labour market conditions have already become visible in the pick-up in negotiated wages. In euro area countries where wage formation processes include backward-looking indexation elements, the pick-up in wage growth can also be expected to be supported by the significant recent increase in headline inflation. In addition, the wage-dampening effects of crisis-related factors, such as the need for wage moderation to regain price competitiveness in some countries and pent-up wage restraint in view of binding downward rigidities in nominal wages during the crisis, should gradually abate as the economic expansion continues and broadens across euro area countries. Furthermore, some government measures that have curbed wage growth in the past are expected to become less relevant.

Profit margins are not expected to exert additional inflationary pressures over the projection horizon. The increases in unit labour cost growth and in unit net indirect taxes are expected be the main source of rising inflationary pressures as measured by the GDP deflator. The pace of expansion of profit margins is expected to be contained, particularly towards the end of the projection horizon, reflecting the mildly decreasing path of growth in activity.

External price pressures are expected to remain positive but should moderate over the projection horizon. The declining path of the import deflator, starting next year, reflects mildly decreasing oil price assumptions that will contain the impact of rising non-oil commodity prices and of gradually rising underlying global price pressures related to diminishing global slack.

HICP inflation is unchanged with respect to the June 2018 projection exercise. HICP inflation excluding food and energy has been revised down slightly for 2019 and 2020, in line with a somewhat weaker growth outlook. These revisions are offset by an upward revision in HICP energy inflation on account of higher electricity and gas prices in some countries in 2018 and the oil price assumptions in euro, which follow a less steep downward path than in the previous projections exercise.

3 Fiscal outlook

The euro area fiscal stance is projected to be broadly neutral in 2018, mildly expansionary in 2019 and again broadly neutral in 2020. The fiscal policy stance is measured as the change in the cyclically adjusted primary balance net of government support to the financial sector. Discretionary measures in 2018 are expansionary, owing partly to cuts in social security contributions and corporate income taxes and partly to more dynamic growth in government spending. However, the stimulus from these discretionary measures is, to a large extent, offset by buoyant direct revenues. In 2019, the main contribution to the expansionary fiscal stance stems from cuts to direct taxes and higher public expenditure in one euro area country, which is partly offset by consolidation in another euro area country. In 2020, further cuts to direct taxes and social security contributions are partly offset by a more subdued growth in transfers and subsidies, as well as in government consumption.

Over the projection horizon, the government deficit and debt ratios are both projected to be on a downward path. The fiscal projection entails a decline in the government deficit over the projection horizon, owing mainly to an improvement in the cyclical component and a decline in interest payments, resulting from the replacement of old, high-cost debt with new debt at lower interest rates. This is partly offset by a deterioration in the cyclically adjusted primary balance. The declining path of the government debt-to-GDP ratio is supported by sustained positive primary balances and a favourable interest-growth rate differential[4]. Compared with the June 2018 projections, the deficit outlook is broadly unchanged, while the debt-to-GDP ratio has been revised slightly up for 2020 owing mainly to a less favourable interest-growth rate differential.

Box 3
Sensitivity analyses

Projections rely heavily on technical assumptions regarding the evolution of certain key variables. Given that some of these variables can have a large impact on the projections for the euro area, examining the sensitivity of the latter with respect to alternative paths of these underlying assumptions can help in the analysis of risks around the projections. This box discusses the uncertainty around some key underlying assumptions and the sensitivity of the projections with respect to these variables.

1) An alternative oil price path

Alternative oil price models point to a risk of oil prices being higher over the projection horizon than suggested by oil price futures. The technical assumptions for oil price developments underlying the baseline projections, based on oil futures markets, predict a mildly declining profile for oil prices, with the price of a barrel of Brent crude oil standing at USD 69 in 2020. This path is consistent with continued growth in world oil demand. As regards supply factors, oil price futures also likely reflect downward impacts on oil prices due to the relaxation of the OPEC policy of supply cuts, which may outweigh slightly lower expectations for US oil output (due to transport bottlenecks) in the short term and concerns about lower supply from Iran following US sanctions. A combination of alternative models used by ECB staff[5] to predict oil prices over the projection horizon points to higher oil prices than those assumed in the technical assumptions. The materialisation of an alternative oil price path derived from these models, in which oil prices are 4.7% higher than in the baseline assumption by 2020, would marginally dampen real GDP growth (by less than 0.1 percentage point in 2019 and 2020), while entailing a slightly faster increase in HICP inflation (up by 0.1 percentage point in 2020).

2) An alternative exchange rate path

This sensitivity analysis investigates the effects of a strengthening of the euro exchange rate. One source of an appreciation risk stems from a stronger than expected economic recovery in the euro area leading to upside inflationary pressures. This scenario is consistent with the distribution of the option-implied risk-neutral densities for the USD/EUR exchange rate on 21 August 2018, which is heavily skewed towards an appreciation of the euro. The 75th percentile of

4 The differential is calculated as the difference between the nominal effective interest rate on debt and the nominal GDP growth rate.

5 See the four-model combination presented in the article entitled “Forecasting the price of oil”, *Economic Bulletin*, Issue 4, ECB, 2015.

that distribution implies an appreciation of the euro vis-à-vis the US dollar to an exchange rate of USD 1.33 per euro in 2020, which is about 16.5% above the baseline assumption for that year. The corresponding assumption for the nominal effective exchange rate of the euro reflects historical regularities, whereby changes in the USD/EUR exchange rate correspond to changes in the effective exchange rate with an elasticity of just above one half. In this scenario, the average of the results from a number of staff macroeconomic models points to real GDP growth being 0.4 percentage point lower in 2019 and 0.5 percentage point lower in 2020. HICP inflation would be 0.5 percentage point lower in 2019 and 0.6 percentage point lower in 2020.

Box 4
Forecasts by other institutions

A number of forecasts for the euro area are available from both international organisations and private sector institutions. However, these forecasts are not strictly comparable with one another or with the ECB/Eurosystem staff macroeconomic projections, as they were finalised at different points in time. Additionally, they use different (partly unspecified) methods to derive assumptions for fiscal, financial and external variables, including oil and other commodity prices. Finally, there are differences in working day adjustment methods across different forecasts (see the table).

As indicated in the table, other institutions' currently available projections for real GDP growth and HICP inflation are within the ranges surrounding the current ECB staff projections (shown in brackets in the table).

Comparison of forecasts for euro area real GDP growth and HICP inflation

(annual percentage changes)

		GDP growth			HICP inflation		
	Date of release	2018	2019	2020	2018	2019	2020
ECB staff projections	September 2018	2.0	1.8	1.7	1.7	1.7	1.7
		[1.8 - 2.2]	[1.0 - 2.6]	[0.6 - 2.8]	[1.6 - 1.8]	[1.1 - 2.3]	[0.9 - 2.5]
European Commission	July 2018	2.1	2.0	-	1.7	1.7	-
OECD	May 2018	2.2	2.1	-	1.6	1.8	-
Euro Zone Barometer	August 2018	2.1	1.8	1.6	1.7	1.6	1.7
Consensus Economics Forecasts	August 2018	2.1	1.8	1.3	1.7	1.6	1.6
Survey of Professional Forecasters	July 2018	2.2	1.9	1.6	1.7	1.7	1.7
IMF	July/April 2018	2.2	1.9	1.7	1.5	1.6	1.8

Sources: European Commission Interim Economic Forecast, Summer 2018; IMF World Economic Outlook Update, July 2018 (GDP), IMF World Economic Outlook, April 2018 (HICP); OECD Economic Outlook, May 2018; Consensus Economics Forecasts, August 2018; the 2020 figure for Consensus Economics is taken from the August 2018 survey on Trends in Productivity and Wages, and the 2020 figure for HICP inflation is taken from the July 2018 long-term forecast survey; MJEconomics for the Euro Zone Barometer, August 2018; and the ECB's Survey of Professional Forecasters, July 2018.
Notes: The Eurosystem and ECB staff macroeconomic projections and the OECD forecasts both report working day-adjusted annual growth rates, whereas the European Commission and the IMF report annual growth rates that are not adjusted for the number of working days per annum. Other forecasts do not specify whether they report working day-adjusted or non-working day-adjusted data.

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